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$$100(1.02)^{X/4} = 200$$

$$(1.02)^{X/4} = 2$$

$$\log(1.02)^{X/4} = \log 2$$

$$\frac{X}{4} \log 1.02 = \log 2$$

$$X \log 1.02 = 4 \log 2$$

$$X = \frac{4 \log 2}{\log 1.02} = 140.262$$

$$\textcircled{31} \log_2(\log_2 X) = 1$$

$$2^1 = \log_2 X$$

$$2^2 = X$$

$$4 = X$$

$$\log_a b = c$$

$$a^c = b$$

$$\textcircled{33} \log x^2 = (\log x)^2$$

$$2 \log x = (\log x)^2$$

$$2y = y^2$$

$$y^2 - 2y = 0$$

$$y(y - 2) = 0$$

$$y = 0 \quad y = 2$$

$$\text{let } y = \log x$$

$$\log x = 0$$

$$x = 1$$

$$\log x = 2$$

$$10^2 = x$$

$$x = 100$$

$$\textcircled{21} \log x + \log(x-21) = 2$$

$$\log x(x-21) = 2$$

$$10^2 = x(x-21)$$

$$100 = x^2 - 21x$$

$$0 = x^2 - 21x - 100$$

$$0 = (x-25)(x+4)$$

$$x=25 \quad x=-4$$